second treatment, and discharges its products on the lowest deck, where the material undergoes a final concentrating treatment, and is discharged completely clean.

"In the foregoing I have dealt with three different sizes of material—the coarse sand, the fine sand, and the slimes. The concentrates in each class differ in value from the other. The concentrates from the slimes have been found to contain the highest bullion-value, which is caused by their containing the largest percentage of galena. The sulphide of lead is very liable to form slimes, even if coarse screens are used at the battery. Special attention is therefore required to the treatment of the slimes; and the large number of slime-treating appliances became a special and most important feature of the Sylvia Company's plant. The whole of the tailings leaving the various concentrating-machines are discharged into concave buddles after having gone through another concentrating process by means of small settling-tanks, which discharge only the heavier part of the tailings into the buddles, where the very small amount of mineral contained in the tailings is deposited at the circumference, whereas the valueless tailings are disposed of finally through the middle of the construction. Three buddles are included in the Sylvia plant—one for treatment of the coarse jigger-tailings, one for the fine table-tailings, and one dressing-buddle for cleaning up such concentrates that have been saved in the other buddles.

"The Sylvia Company's works have been laid out in such a manner that the different floors have sufficient fall from one to another to admit of the whole of the ore being transmitted to every machine by gravitation. The quartz is conveyed from the mine to the battery by a steel-wire aerial tramway, and passes, after having been fed into the stamper-boxes, gradually through the various sheds and concentrating appliances without any other handling of the material required than the removal of the finished concentrates. The whole plant is driven by water-power acting, under pressure of 55lb. per square inch, on a 6ft. Pelton wheel. The same race that supplies the motive-power supplies also the large amount of water required for the dressing process, and the power for driving a Crompton dynamo of thirty sixteen-candle Edison-Swan lamps, which illuminate the whole of the sheds.

"In the above I did not give a full description of all the details of the various concentrating appliances which form the Sylvia Company's ore-dressing plant. Such description is contained in your report on the Mount Bischoff Company's plant ("Mining Machinery and Treatment of Ores in Australian Colonies, 1889"), where similar appliances are in use. Further information on the construction of jiggers, tables, and buddles may be obtained from the Transactions, Mining Assoc., Corn., Vol. xi., which contains an excellent paper by H. W. Kayser, Esq., M.E., who has been intimately connected with the planning and construction of the Sylvia plant.

"A few weeks only have elapsed since the opening of the Sylvia works, and it would be premature to give a statement on cost of concentration and percentage of concentrates saved; but I may be allowed to give such information at a future date.

"The whole plant works very satisfactorily, and the concentrating process, which is a mechanical and automatic one, of which the main and sole agents are specific gravity and water, is efficient and cheap, the dressing-expenses not amounting to more than a few shillings per ton. In connection with the works is a furnace for drying the concentrates; also a laboratory for assaying and analysis. The whole of the dressing-machinery has been built on the battery-site, of New Zealand material, the iron parts only having been imported. The crushing plant and water-motors have been manufactured at the Thames. The whole of the timber and other material answers the purpose excellently.

"The results of the concentration process have been so far very satisfactory. The value of the clean-dressed ore or concentrates so far obtained, varies from £50 to £100 per ton. The quantity of mineral contained in the quartz will average not less than 10 per cent.

"The prospects of the Sylvia Mine and plant are very good in every respect, the mine being opened up in an efficient manner, and the plant answering its purpose well.

"The Sylvia Company does not intend for the present to submit their concentrates to any extraction process here, but disposes of the same by selling them in the best market. Extraction-works will probably be added to the present works in the near future.

"The ore-concentration system, as described above, has not been applied before to gold-ores, neither in the colonies nor elsewhere to my knowledge; its application to the treatment of Thames complex ore may therefore be called a new departure in the metallurgy of gold-ores generally, and of the Thames Goldfield specially, and its satisfactory results will certainly prove to be of the greatest general interest and consequence. I feel confident that a very large amount of ore called refractory, hitherto neglected, may in the near future be turned to profit after the Sylvia Company have shown how to deal with such ore. I beg to enclose two plans giving views and sections of the dressing plant, and which I trust do not require further explanation."

The plant is one of the best for concentrating ore there is in the colony, and reflects the highest credit on Dr. Scheidel and those employed under him for the manner in which it has been constructed and erected; but it seems questionable whether the class of ore there is to deal with here is suitable for concentration. On my recent visit, in May last, the plant was working as well as could be desired, and was producing concentrates of a value of from £25 to £50 per ton; but this does not seem to give a high percentage on the assay-value of the ore made before the plant was completed. The large quantity of sulphides in the ore prevents anything like a large percentage of the gold and silver being extracted by concentration, especially the latter metal, sulphur being so light a substance; and its great affinity for metals will carry a certain quantity of them away with the water, which does not remain amongst the tailings, but is carried away with the muddy water into the creek, and passes down with the stream. My impression on seeing this plant at work was that there is a great loss of gold and silver, especially the